DOCUMENT RESUME

ED 204 762 CS 206 393

AUTHOR Woodall, W. Gill: And Others
TITLE From the Boob Tube to the Black Box: TV News Comprehension from an Information Processing Perspective.
PUB DATE Aug 81
NOTE 25p.: Paper presented at the Annual Meeting of the Association for Education in Journalism (64th, East Lansing, MI, August 8-11, 1981).

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Cognitive Processes: *Comprehension: Information Sources: Journalism: *News Media: *Research Methodology: Research Needs: *Television: *Television Research
IDENTIFIERS *Media Effects: *Media Use

ABSTRACT

Based on data drawn from a larger study concerning what people learn from television news broadcasts, this paper suggests ways that researchers might conceptualize audience comprehension of television news. Following a review of the information processing literature, the paper analyzes several conceptualizations taken from the literature and discusses their relevancy for guiding research on television news comprehension. The paper concludes with specific recommendations for future research, including (1) the development and testing of a variety of measures of recall and comprehension, (2) the use of visual and verbal retrieval cues to assess how best to aid individuals in recalling news content, and (3) the development of measures that allow the evaluation of the usefulness and depth of viewers' understanding of specific stories. (FL)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED2047762

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

FROM THE BOOB TUBE TO THE BLACK BOX: TV NEWS COMPREHENSION FROM AN INFORMATION PROCESSING PERSPECTIVE

By

W. Gill Woodall, Dennis K. Davis
and Haluk Sahin
Cleveland State University
Cleveland, Ohio

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
W. Gill Woodall
Dennis K. Davis
Haluk Sahin
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

CS206373

Presented to the Theory and Methodology Division, Association for Education in Journalism, annual convention, Michigan State University, East Lansing, MI, 1981.

Introduction

Every evening the network television news broadcasts provide us with the opportunity to encounter people and events which are remote from our everyday world. Some media analysts, most notably Marshall McLuhan (1964), have argued that the electronic media can serve as simple extensions of our senses so that through the medium of television we can move beyond the boundaries of our everyday experiences. McLuhan has argued that television encourages and may even compel our participation in a "global village" in which the boundaries of space and time are dissolved. Such visionary analyses of the role of media in our lives fail to recognize that using media to expand our experiential horizons is not easily accomplished. Placing ourselves in front of an operating television set does not guarantee that we can look through this electronic window and metaphorically step into another world. Important cognitive skills are essential if we are to make sense of news broadcasts in useful ways.

The daily news broadcasts confront us with more than two dozen rather unrelated, brief stories concerning people, places and activities which our personal experiences do not prepare us to understand. The task of making sense of these stories is potentially quite problematic. Often, we must draw upon a store of information which we can recall from previous news stories in order to make sense of today's news. If we have been unable to make sense of earlier stories or recall details from them, it is unlikely that we will suddenly be able to comprehend the news today.

The news broadcasts are not designed to assist us in our comprehension efforts. Instead, many potential barriers to comprehension exist. Broadcasts are fast-paced, moving quickly from one story to another. Even within stories, several sources are interviewed often and video-tapes from several locations around the country may be combined. Images of people, places and events flash on the screen behind the news anchor with only a very fleeting identification of who or what they are. Reporters seem to have a dread of repetition, choosing instead to dwell upon bits of inside information given them by undisclosed but highly valued news sources. The news must above all be new, or at least give the appearance of being new. It must not be boring. It must dazzle us with technological marvels so that our heads are filled with fleeting impressions of what is going on in the world. If we were given the time to ponder these impressions and were better prepared to comprehend them, would we be so convinced that television is the most trustworthy and credible news source?

Conceptualization of News Comprehension

For more than two years, we have been engaged in research which seeks to evaluate what people learn from TV news broadcasts. We began with relatively unstructured interviews of news viewers conducted within a few hours after broadcasts ended. These interviews were conducted in England (Dyer and Robinson, 1980) and in nine U.S. cities (Robinson, et. al., 1980). Our long-term intent is to use these interviews as a basis for designing future research projects which will provide a progressively better means of understanding news comprehension.

The focus of our initial research has been on what people could remember about news items they had just viewed. We have evaluated this data from a substantive perspective in our earlier research reports. In this paper we will explore the methodological implications of our data. How should future research be designed now that we know what people seem able to tell us about their viewing experiences? We have sought to answer this methodological question by systematically considering some alternate ways that news comprehension might be conceptualized and operationalized. We have drawn upon literature in information processing to develop these alternate conceptualizations. We have concluded this paper with specific recommendations for future research.

"Processing" the News

One of the best developed research traditions which has concerned itself with explaining how and why people comprehend messages is the information processing perspective in cognitive psychology. It is important to recognize that this tradition has not concerned itself with television news specifically. The rather abstract concepts and discrete findings which make up the information processing literature need to be carefully examined to assess their heuristic value for the study of news comprehension. Trying to make sense of the nightly news in the comfort and chaos of one's living or dining room is quite different from the task of memorizing word lists in a psychological laboratory with 40 other introductory psychology students. We have sought to broaden and elaborate narrowly developed information processing concepts so that these concepts can be usefully applied to the study of news comprehension.

Our effort to adapt concepts borrowed from cognitive psychology to the study of television news is not innovative. Examples of previous efforts include Perloff, Wartella and Becker (1979) and a long series of studies by Findahl and Hoijer (1971,1973,1974,1975,1976,in press). Our work is innovative to the extent that we have a body of research findings which we can use to help us evaluate the potential usefulness of various conceptualizations. Such evaluation is necessary because the application of various concepts is problematic as we have illustrated below.

Historically, the information processing approach has had several serious limitations. Conscious learning and recall of simple information in laboratory settings has been overemphasized. Interpretation and application of findings from such research has been difficult. Models of memory and comprehension have tended to focus on learning which results from exposure to the written or spoken word. Exposure to nonverbal stimuli has been ignored. Models have tended to be mechanistic, assuming simple functional relationships between exposure to stimuli and development of comprehension or increases in recall. An implicit image of man in some research is that of a self-programming computer whose goal is to program itself in the most efficient way possible in order to deal effectively with recurring problems which it must solve.

An interesting and heuristic effort to apply existing information processing theory to the problem of news comprehension is found in the work of Findahl and Hoijer (in press). They have based their work on a proposition model of memory developed by Kintsch (1974). They argue that

television news comprehension involves grouping, sorting, reduction and condensation of message bits into an "inner language", or set of propositions, which are then synthesized and represent the 'gist' of the message. The synthesis of such propositions must draw upon an individual's previous experiences and conceptions of reality which exist as a cognitive framework or schema for processing new information. When previous experiences are limited or conceptions of reality undeveloped, gaps in comprehension can be expected to occur. When message formats or content interfere with the synthesis of information, comprehension will be reduced. This research has provided a useful guide for our own efforts to review and apply information processing theory. We have gone beyond the work of Findahl and Höijer by drawing upon a wider range of information processing research which we have then reviewed in the light of our own and other research findings on news comprehension.

Remembering Versus Understanding

In the review of information processing research reported below we have grouped studies into two categories. This grouping is based upon a distinction suggested by Ortony (1978). He has emphasized the necessity for conceptualizing the mental processes which underlie recall of information separately from the processes which underlie understanding of information. Different models may be necessary to adequately conceptualize these two types of processes. We are convinced that this distinction is a very necessary one for news research. Our initial findings indicate that many people can recall bits of information from stories while at the same time showing little

evidence that they have actually understood the stories in any personally meaningful way. We noted a "meltdown effect" in which bits of information recalled from two or more news stories were confused. This leads us to conclude that people frequently remember information which they cannot understand. Understanding is clearly not a necessary condition for recall of information. It also appears likely that people can understand a news story without being able to remember much about it. Some viewers could only report the main points of news stories and were unable to remember details. Such viewers may have already "synthesized" stories and forgotten details which they no longer need to aid them in developing their understanding of the stories. An inability to recall specific detail of stories may not be a good index of understanding. For this reason, tests of news comprehension conducted by some researchers which focus on recall of specific details in news stories may be biased against viewers who "synthesize" stories quickly. We have examined the literature in both the areas of memory and comprehension because we expect that indices of both types of mental processes will be useful in future research. We also believe that this research will be more productive if these two types of processes are carefully differentiated.

Research on Remembering

One line of research which may be applicable to studies of news comprehension has been concerned with the effect of contextual information on the retrieval of target or to-be-remembered information. Research on episodic memory and the encoding specificity principle (see Watkins & Tulving, 1975 for a review) has been developed within highly controlled

laboratory conditions. Episodic models of memory assume that what is retained in a remembered event is a unique memory trace of the episode, that is, the person's encounter with a particular item in a particular context at a particular time. Thus, for example, what might be remembered from a television news story is a function of the information or content of the story and the 'context' in which it is presented. Remembering an event (news story information) may require that a news viewer be presented with a retrieval cue sufficiently matched to the information stored in the memory trace (the news information and its context). Such retrieval cues might be selected from those in the individual's environment (cued recall), or in the case of "free recall", the retrieval cue would have to be generated by the individual. Our previous research has had some success in using very brief, rather vague cues to aid or cue recall. However, the failure of some people to provide much information about stories in response to such cues may not be an indication that they have no recall of the stories. They may simply need different retrieval cues. In general, we used verbal cues. Cues referring to visual images might have aided some persons more in recalling information. In general our technique of using retrieval cues to aid recall seemed to be more useful than earlier research which was based on "free recall". Such research suggested that viewer comprehension of news was virtually non-existant. We believe that this research seriously underestimated viewer recall. Our own research is likely to also have underestimated recall as well because we relied upon a fixed set of rather abstract, verbal retrieval cues.

The encoding specificity principle holds that:

> "Specific encoding operations performed on what is perceived determine what is stored, and what is stored determines what retrieval cues are effective in providing access to what is stored (Tulving & Thomson, 1973, p. 353)."

Research by Tulving and his associates has shown that contextual cues that are stored as part of the episodic memory trace can act as very effective retrieval cues in recalling information. Most of this research is based upon list-learning techniques. Subjects in these studies are given lists of target or to-be-remembered words that have been paired with input cue words. These cue words were related to the target words in a semantically "weak" way. For example, the target word "cold" was paired with "ground", the target "day" with "sun", etc. The input cue words here (ground, sun) acted as a context for the target words (cold, day). The evidence from these list learning studies indicates that subjects were able to recall the target words (cold, day) when given the "weak" contextual cues (ground, sun) in a cued recall test as well as when given strongly related cue words (night for day, warm for cold), and were better at contextual cued recall than when given a list of words that contained the targets and asked to choose or recognize the targets from the list. Thus, this research shows that contextual cues that are weakly related or not semantically related to target information can act as highly effective retrieval cues in recall situations, and more effective than when subjects are given a 'copy' of the target information to recognize.

Other studies have validated these findings in broader research settings. Watkins, Ho and Tulving (1976) for instance, have shown that verbal information (in this case words) can serve as contextual information for the subsequent recognition of a visual target (pictures of faces). More recently, Woodall and Folger (1980) have shown that nonverbal visual cues (such as hand gestures) that co-occur with linguistic information (in this case, short verbal phrases)

can act as contextual cues that provide subsequent access to that linguistic information stored in memory.[1] Thus, it seems that episodic memory and encoding specificity may be generalized beyond narrow experimental paradigms and applied to assessing the storage and retrieval of televised news information.

The question for this view then becomes, of the visual, vocal and verbal information present in a TV news broadcast, what constitutes contextual information and what constitutes the target or to-be-remembered information. One plausible procedure is to treat visual information as providing the context for the target verbal information. Thus, an episodic memory trace of TV news could be made up of two parts: the visual information (pictures, film/videotape images, diagrams and graphs) which constitutes the context and verbal information which constitutes the target. The encoding specificity principle would hold that successful recall of verbal content requires that a respondant be presented with enough of the visual context to match the memory trace. We would expect to find significant variation among individuals in terms of the kind and amount of visual information which would be necessary to aid them in recalling verbal information. Some persons might be quite <u>visually dependent</u>, requiring large amounts of contextual information before being able to recall target information. On the other hand, our own research has demonstrated that some persons can recall large amounts of verbal information on the basis of verbal retrieval cues alone. We could categorize such respondants as <u>visually independent</u>. If there are significant numbers of respondents who are visually dependent, then our own and other news research which has relied on verbal cues will have underestimated their ability to recall verbal information. Future research should explore this question of visual dependency. We might find that "knowledge gaps" between educated

and less educated respondents are not as large when visual as well as verbal cues are used to aid recall.

Our research has indicated that for a very small minority of viewers (probably less than five per cent) verbal information may provide the context for target visual information. In response to our abstract verbal cues, these respondants consistently recalled visual information. Perhaps the most striking example of such recall was the woman who responded to the cue "President's Speech" by recalling that Rosalyn was standing next to Jimmy wearing a red dress. It may also be true that the usual context/target relationship between visual and verbal information may be reversed for certain news stories which are largely visual such that the words simply serve to explain the context for the pictures. In our research there was some evidence that this was true of the news stories which reported on the Pope's trip to Poland. These stories featured very striking visual reports of speeches before huge crowds and emotional encounters between the Pope and small groups of persons. In these stories the verbal information simply served to tell people where the Pope was. For many respondants such information was clearly less important than what they saw the Pope doing. In applying an episodic model of memory to the study of TV news recall, it will be necessary to use the model with some caution. However, there appear to be many useful insights which can be gained by creatively exploring how different types of retrieval cues can aid different types of news viewers in recalling varying forms of information. Such research can help to specify more precisely what people can recall after viewing a news broadcast and thus provide some important, elementary information about the news viewing experience and its consequences.

Research on Understanding

In developing a perspective on how viewers come to understand televised news, it is again important to consider the inter-relationship between verbal and visual information, and to evaluate how such information might be dealt with cognitively. Ortony (1978), working from a semantic network model of memory, argues that comprehension involves the utilization of knowledge that is stored in long-term memory. Thus, the information we encounter in the present can only be understood by relying upon pre-existing forms of knowledge which permit us to make sense of it. Ortony conceptualizes such pre-existing knowledge as a complex network of interrelated 'nodes' (words, concepts, properties and their interrelationships) that are linked together by types of relations. For example, the node 'DC-10' might be linked to the node 'airplane' by a class relationship, and to the node 'accident' by time and place relationships. The process of comprehension can be conceived of as involving an interaction between new information (both verbal and visual) and the pre-existing network of nodes. In any particular case, some set of nodes are "activated" by the input of new information such that a set of inferences are produced about this information. The plausibility of this model is enhanced by its ability to account for the importance of pre-existing knowledge for making sense of new information. In our data, the most striking evidence of the importance of pre-existing knowledge involved a news story in which President Carter was reported as challenging Congress by failing to lift an economic embargo of Zimbabwe-Rhodesia. Recall of any information about this story was quite low and very fragmentary. The most common way of interpreting the story was that Carter was in trouble with Congress again over some African country. Many viewers may have had difficulty in understanding this story because they did not understand what an economic

embargo was. The term Zimbabwe-Rhodesia may have been unclear to others. The story provided little background information. Regular news viewers might have been expected to know such information because it had been given in earlier broadcasts. In contrast, we found that some stories seemed to have been quite well comprehended. News stories about the crash of a DC-10 aircraft in Chicago were generally well remembered. Main points of these stories were frequently mentioned. Such dramatic stories may compel attention in such a way that background information is learned which prepares viewers for the task of comprehending later follow-up stories which do not repeat basic information. Similarly, we would expect that stories which deal with matters familiar to most viewers will be well understood because then viewers can rely upon a network of nodes acquired through daily experience.

It should also be useful to make another distinction described by Ortony. He argues that comprehension is not an all-or-nothing process; rather, information may be processed on several different levels with greater or lesser 'depth'. Deep processing can be understood as greater degrees of semantic involvement, and for Ortony's semantic network model would imply a larger number and more extensive activation of nodes. Depth of processing research (Craik & Lockhart, 1972) shows that information that is processed deeply takes longer to process and is more likely to be recalled than information processed in a shallow way. We might also expect that such information may be better integrated in long term memory than shallowly processed information.

If we assume a semantic network and depth of processing explanation (even one as generally and roughly sketched as it is here) the application

of such a comprehension explanation to processing televised news proves interesting. Several key considerations can be discussed. First, one of the factors that Ortony (1978) claims to affect the depth at which information is processed is its context. Once again, casting visual information in a contextual role implies that visual cues present in news stories may operate to clarify and "deepen" comprehension of stories. Visual cues could encourage deeper and more elaborate processing of information than would otherwise occur if such cues were absent. However, our research findings also suggest that visual information can make stories more difficult to understand when visual cues are not closely related to verbal information. It is important to recognize that visual cues might have the potential for deepening viewers' comprehension but that this potential is not always realized.

Visual information could aid processing in several ways. One way would be when co-occurring visual cues are closely linked semantically to the verbal information so as to be repetitive or redundant. However the same visual cues might aid one news story while leading to confusion about another depending upon the semantic links between these cues and verbal information. For example, a video-tape of motorists waiting in line to buy gasoline might clarify and increase understanding of a news story about nationwide gasoline shortages. But the same film when used to highlight the threat of what might happen if the Iran-Iraq war cuts off oil shipments could confuse some viewers and lead them to expect immediate shortages. Our research encountered many examples of very loose semantic links between visual and verbal information. A complex news story about German-American relations was accompanied by pleasant pictures of Carter and Helmut Schmit strolling on the White House lawn. A long story on pollution contained many aerial photos and films of pollution in various cities which tended to distract attention from complex verbal information.

Another way that visual information can aid comprehension is when it provides information which complements verbal information. Some things can be shown visually which would be quite difficult to explain verbally. News stories about the DC-10 crash in Chicago featured pictures of the wing pylon similar to the one which may have cracked prior to the crash. Long, detailed verbal descriptions could not have provided as useful an understanding of this part and its location on the aircraft. Recall of this story was quite high, perhaps because the pictures so graphically illustrated the verbal explanations of what had caused the accident. Visual information can inhibit comprehension if this information contradicts or distracts from verbal information. Often, only a small part of the story can be shown visually while the other parts of the story must be verbally explained. The part of the story which is visually displayed may seem to be more important because it is both seen and heard. One news story which many viewers seemed to have difficulty understanding concerned a shootout between a kidnapper and police on a Los Angeles freeway. A film of the shootout was shown accompanied by a verbal description of the events which led up to the incident. Many viewers seemed confused about the identity of the person killed in the shootout. Some thought it was the kidnap victim. Others seemed unaware of the kidnapping. Still others did not seem to understand that it was the police who shot the kidnapper. There was high recall of the very dramatic shootout but little understanding of its causes. In terms of a semantic network model, the visual image activates a different set of concepts than the verbal information, depth of processing is reduced and comprehension suffers.

Research in another area of information processing also suggests that visual images should aid comprehension. Paivio (1971) has advanced the dual-coding hypothesis, which holds that memory codes are created for both visual images and for verbal processes. If visual images are not supplied for a

verbal message, we may use our imagination to supply the missing images. Such imagery, whether it is supplied to us or created by us, has been shown to play a vital role in understanding by both Paivio and Bower (1972). One key finding is that information which prompts individuals to create imagery is more deeply processed. This has been shown to be the case for verbal information (Enzle, Hansen & Lowe, 1975) as well as for visual information (Bower & Karlin, 1974). This suggests that televised news may be more deeply processed when it prompts the creation of images. Visual information in particular may have a strong potential to evoke other images and result in deeper and more elaborate processing. However, the images evoked by visual information on the TV screen may not always produce an appropriate understanding of a news story. Instead, a misleading interpretation may result which is held all the more strongly because it has been deeply processed. We found one striking but apparently harmless misunderstanding which resulted from a quite complex news story. The story was a follow-up on the DC-10 crash and featured a tape of a conversation between two control tower operators as well as still photographs of the crash. The photographs were displayed in sequence and showed the aircraft going into its fatal descent. Several viewers reported that they had seen a film of the crash rather than still photographs. Others reported having heard the voice of the pilot, including his last words. Most puzzling of all were the three viewers who reported hearing a tape of a pilot who said that his plane was running out of fuel. Some months earlier such a tape had been broadcast after a plane crash in Oregon. Our best explantion of these misinterpretations is that the news story encouraged viewers to supply missing auditory or visual images. The still photos evoked a complete sequence of images in viewer's minds. Viewers who had heard the tape of the pilot months before may have immediately inferred that they were once again hearing a pilot and used the earlier auditory images to "fill in"

information missing in this tape. This example illustrates the risks of using dramatic but ambiguous visual or verbal information because such information can encourage viewers to supply missing facts. Such information may lead to comprehension which is based on deep processing but is wrong. Because it is based on deep processing, this understanding of the story is likely to persist and may even become the basis for misinterpretations of later stories.

Attributes of Information: Concreteness and Vividness

It is unlikely that all visual or verbal information is equally likely to prompt viewers to create their own images. There may be some attributes of visual or verbal information which make this information more likely to evoke images. One attribute suggested by Paivio (1971) and others is the concreteness of the information. Concreteness can be defined as the degree of detail and specificity about actors, actions, and situational context (Nisbett & Ross, 1980). Findahl and Höijer (1976) present some evidence that TV news viewers are more likely to recall concrete details of news programs (the who, what, where details) than more abstract explantions of causes or consequences associated with a news story. In our research we often found that viewers could only recall bits and pieces of concrete detail from stories which they occasionally misinterpreted as being the main point of the stories. Viewers clearly puzzled by the Zimbabwe-Rhodesia story described above reported hearing a black man accuse Carter of not being a good Christian (a taped interview of Prime Minister Muzarawa included this comment) or mentioned seeing some Congressmen who were upset with Carter again. The question of the economic embargo itself was too abstract to be understood. On the other hand, concrete detail, especially detail which evokes images derived from personal experience, seems likely to improve the understanding of stories. Catholic viewers of religious rites depicted during the Pope's trip to Poland should have been more likely to develop a "deeper" understanding of these news stories because they could relate some of the concrete details to their

personal experiences just as frequent air travelers were likely to find that the news stories about the DC-10 crash evoked many images acquired through personal experience. It should be noted however that much of what we see in the news tends to be remote from our personal experiences. It is likely therefore that the concrete detail frequently included in news stories can be misleading because it may evoke the "wrong" images. Such concrete detail may appear to provide a clear link between the world of TV news and our own world of daily life but this link is at best very tenuous.

Another attribute of visual or verbal information is vividness. Information processing researchers (such as Paivio) as well as attribution theorists interested in everyday inference making strategies (Nisbett & Ross, 1980) agree that the degree of vividness of information and in turn the vividness of the images evoked by such information are important in determining the degree to which information will be understood and remembered. Vivid information can be broadly defined as information which compels our attention and encourages us to create powerful images which we use to interpret it. Such information is likely to be deeply processed. Nisbett and Ross (1980) have argued that vivid information may have a dual effect: an immediate influence upon initial inferences made about information as well as a delayed influence upon future inferences because inferences based on such information are more likely to be easily recalled. In this way, vivid information can have an accumulating influence upon our comprehension of news stories which is far greater than routine information. Vivid information which evokes images which enable us to create a useful understanding of a specific news story will also increase the likelihood that we will rely upon this understanding when interpreting other stories including similar information. This could create what can be referred to as a "spiral of increasing understanding". But it is also possible for vivid information to evoke images which encourage the creation

of useless or inappropriate ways of understanding present and future news stories. A "spiral of increasing misunderstanding" is possible as well.

The problem with vivid visual or verbal information reported by TV news is that much of it is reported very quickly with only a brief period of time for viewers to develop their understanding of it. When two sources of vivid information are combined as in the example we desribed above concerning the DC-10 crash tapes and pictures, misinterpretation would appear to be inevitable unless a large amount of redundant and complementary information is provided. In this case the resulting misinterpretations would appear to be harmless and unlikely to result in a "spiral of misunderstanding". But it is interesting to speculate concerning the influence of early news coverage of the Iranian crisis upon TV viewers' comprehension of later stories. Much vivid information was included. Was sufficient redundant and complementary information presented? Clearly, the question of the immediate and long-term consequences of the use of vivid information in news stories is an important one. Such information is avidly sought out by news reporters and producers anxious to increase the ratings of their programs. In the case of Iran, ABC news was able to raise its ratings significantly before the other networks were able to broadcast their own pictures "live" from Tehran. Research is necessary to establish how such information can be most responsibly presented to the public.

Suggestions for Future Research

Our review of the information processing literature has suggested several important areas for future research. Perhaps the most important of these in terms of our own research program will involve the development and testing of a variety of measures of recall and comprehension. We plan to conduct experimental research using a variety of visual and verbal retrieval cues to asses how best to aid individuals in recalling news content. This research will also enable us to determine whether some persons are more visually dependent and require visual

cues to aid them in recalling verbal information. We hope to develop measures of comprehension which allow us to evaluate the usefulness and depth of viewers' understanding of specific stories. Typically, the most important news stories of the day are "dramatic wholes" as defined by Kenneth Burke. That is, they include actors, actions, situations or scenes, motives and consequences. Even when some of these elements are left out of news stories, they are nonetheless implied by the stories. The most problematic interpretations of news stories may occur when sufficient information is supplied by the story to encourage widespread deep processing of it but crucial details must be supplied by viewers. Vivid, concrete information may be supplied which creates widespread misunderstanding as viewers struggle to fill in missing images and make sense of the powerful story they have been told. We intend to explore this question of how people construct interpretations of important news stories in much greater detail through the use of experiments and field research. We will be seeking answers to questions like those listed below:

1. When do most viewers "process" news stories? Do they seek to make sense of them immediately or do they delay making interpretations? Does the rapid pace of news programs interfere with "processing" or are viewers able to "process" important stories while ignoring unimportant stories and commercials?
2. How redundant should news stories be? Does redundancy aid comprehension by helping viewers to locate the most important information in a story or is it likely to be boring to most viewers? Would greater redundancy in stories allow viewers more time to reflect upon and process information. Or would redundancy lead to boredom which would discourage reflection?
3. How important is it for verbal and visual information to be complementary? Should visual information which exaggerates the importance of certain parts of a story be avoided or is there some way of presenting this

information so that it does not distract from or overwhelm information about other parts of the story. How much does complementary information enhance understanding of the average news story?

4. How do concrete details increase or inhibit understanding of news stories? How potentially misleading are concrete details which are likely to encourage viewers to use personal experiences as a basis for understanding remote news events? Can concrete details imply a simplistic interpretation of a complex event?
5. How does vivid information increase or inhibit understanding of news stories? When is vivid information likely to encourage a "spiral of understanding" or a "spiral of misunderstanding". When should vivid information be avoided and when might it be useful to viewers?

It is quite important to recognize that the process of news comprehension is a cumulative process both for the individual and for society. Our ability or inability to understand the news presented to us on any given day will leave us more prepared or less prepared to understand the news tomorrow. Misconceptions of important stories can persist and influence future comprehension. As a society, we make decisions about collective actions based on our understanding of the world around us which we derive in part from news stories. We elect presidents and select homes and jobs on the basis of understandings which may be linked to our comprehension of news. If there is widespread and increasing misunderstanding of certain news stories, we may all make poorer decisions. Similarly, increasing our ability to comprehend news well might have benefits which it is difficult to anticipate. Increasing the public's ability to comprehend television news could well be as important to our generation as the campaigns for literacy and public education were for earlier generations.

REFERENCE NOTES

1. The first author would like to acknowledge the important influence of the collaborative work with Joseph P. Folger on the present paper. Much of the information processing analysis involved in that work has clarified how information processing may be applied to the comprehension of televised news.

REFERENCES

Bower, G. H. Mental imagery and associative learning. In L. Gregg (Ed.), Cognition in learning and memory. New York: Wiley, 1972.

Bower, G. H. & Karlin, M. B. Depth of processing: Pictures of faces and recognition memory. Journal of Experimental Psychology, 1974, 103, 751-757.

Craik, F. I. M. & Lockhart, R. S. Levels of processing: A framework for memory research. Journal of Verbal Learning and Verbal Behavior, 1972, 11, 671-784.

Craik, F. I. M. & Tulving, E. Depth of processing and the retention of words in episodic memory. Journal of Experimental Psychology: General, 1975, 104, 268-294.

Dyer, N. & Robinson, J. P. Comprehension of televised news: A multi-method approach. Paper presented at the annual convention of the International Communication Association, Acapulco, May 22, 1980.

Enzle, M. E., Hansen, R. D., & Lowe, C. A. Humanizing the mixed-motive paradigm: Methodological imprications from attribution theory. Simulation and Games, 1975, 6, 151-165.

Findahl, Olle The effect of visual illustrations on perception and retention of news programmes. Stockholm: Sveriges Radio, 1971.

Findahl, O. & Hoijer, B. An analysis of errors in the recollection of a news program. Stockholm: Sveriges Radio, 1973.

Findahl, O. & Hoijer, B. On knowledge, social privilege and the news. Stockholm: Sveriges Radio, 1974.

Findahl, O. & Hoijer, B. Effect of additional verbal information on retention of a radio news program. Journalism Quarterly, 1975, 52, 493-498.

Findahl, O. & Hoijer, B. Fragments of reality: An experiment with news and TV-visuals. Stockholm: Sveriges Radio, 1976.

Findahl, O. & Hoijer, B. Studies of news from the perspective of human comprehension, in press.

Kintsch, W. The organization of meaning in memory. New York: Wiley, 1974.

McLuhan, M. Understanding media: The extensions of man. New York: McGraw-Hill, 1964.

Nisbett, R. & Ross, L. Human inference: Strategies and shortcomings of social judgement. Englewood Cliffs, N.J.: Prentice-Hall, 1980.

Ortony, A. Remembering, understanding and representation. Cognitive Science, 1978, 2, 53-69.

Paivio, A. Imagery and verbal processes. New York: Holt, Rinehart & Winston, 1971.

Perloff, R. M., Wartella, E. A. & Becker, L. B. The impact of news formats on adults' learning from TV news. Paper presented at the annual convention of the Midwest Association for Public Opinion Research, Chicago, November 2-3, 1979.

Robinson, J. P., Davis, D., Sahin, H. & O'Toole, T. Comprehension of television news: How alert is the audience? Paper presented at the annual convention of the Association for Education in Journalism, Boston, August, 1980.

Sahin, H. & Robinson, J. P. Is there light at the end of the flow? Audience comprehension of international news stories. Paper presented at the World Communications Conference, Philadelphia, May 12, 1980.

Tulving, E. & Thomson, D. Encoding specificity and retrieval processes in episodic memory. Psychological Review, 1973, 80, 352-373.

Watkins, M. J., Ho, E. & Tulving, E. Context effects in recognition memory for faces. Journal of Verbal Learning and Verbal Behavior, 1976, 15, 505-517.

Watkins, M. J. & Tulving, E. Episodic memory: When recognition fails. Journal of Experimental Psychology: General, 1975, 103, 5-29.

Woodall, W. G. & Folger, J. P. Encoding specificity and nonverbal cue context: An expansion of episodic memory research. Paper presented at the annual convention of the Speech Communication Association, New York City, November 13-16, 1980.